

## Chapter 2 How Soil Forms Notes

### **What is Soil?**

- Loose material where plants grow
- Bedrock – solid layer under soil
- Weathered bedrock becomes basis for soil

### **Soil Composition**

- Mix of weathered rock, minerals, rotted organic material, air and water
- Weathered rock – silt, clay, sand
- Organic materials – humus
- Humus – dark material left when animals and plants decay
- Humus – retains water, creates spaces between rock particles for water and air
- Humus – has nutrients like nitrogen, phosphorus, sulfur, and potassium
- Fertility is a measure of how well soil supports plant growth
- High humus content = high fertility
- Low humus content = low fertility

### **Soil Texture**

- Determined by size of particles – clay is soft, sand is gritty
- Particles sorted by size, clay = small particles, gravel = large particles
- Texture influences plant growth, clay soils = dense tightly packed particles – hold lots of water – plants don't get enough air to the roots and “drown”

Sandy soil = large particles – water drains away – plants don't have enough water

- Loam = best balance, equal parts sand, clay and silt – crumbly – has both air and water – plants thrive
- From the chart on page 49 – clay =  $1/256$  mm, silt  $1/16$  mm, sand 2 mm, gravel more than 2 mm

### **Process of Soil Formation**

- Weathered bedrock mixes with material on the surface
- Bedrock exposed to the surface – soil is being formed
- Soil horizon – layer that is different than the layers around it
- “A” horizon – topsoil – humus, clay minerals
- “B” horizon – subsoil (under the topsoil) – clay and minerals carried down from the topsoil. Little or no humus
- “C” horizon – partly weathered rock, no humus

#### ***Insert drawings of horizon layers on page 50***

- Weathering depend on temperature and rainfall, faster where it is warm and wet, slower where it is cold and dry
- Soil is made faster in warm wet climates
- Types of rock – limestone weathers faster than granite, so soil forms faster from limestone than from granite

### **Soil Types**

- Determined by climate, plants that grow, what it is made of
- Areas of heavy rain (tropical) soil forms quickly but heavy rain can wash away the humus layer
- Areas of cold usually have thin soil layers

- Most fertile – moderate temperatures and rainfall – not too much, not too little – just right!
- Most abundant plants used to classify soil type
- Grasslands have different soils than forests
- Composition – rocky, sandy, or clay
- North America – forest, prairie, desert, mountain, tundra and tropical (see map page 51)

### **Living Organisms in Soil**

- Create humus (decomposers) or mix soil (worms, moles, gophers etc)
- Plant leaves = layer called litter
- Dead plants (leaves and roots) store nutrients – decomposers break plant material down and release the nutrients to be used again
- Decomposers – fungi ( molds & mushrooms), bacteria, worms and others

### **Mixing the Soil**

- Earthworms do most of the mixing
- Waste = castings – rich in nutrients
- Burrowing animals – mice, moles, prairie dogs, gophers mix soil as they dig – add nitrogen to soil with their waste – add organic stuff when they die and decay
- Earthworms and burrowing animals aerate ( mix air into) soil

## **Vocabulary to know**

Soil

Bedrock

Humus

Fertility

Loam

Soil horizon

Topsoil

Subsoil

Litter

Decomposers